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The Sensed Presence Within Experimental Settings: Implications for the Male and Female Concept of Self

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ABSTRACT. The sense of "a presence" or of a sentient being during partial sensory deprivation and exposure to very weak, complex magnetic fields across the cerebral hemispheres may be a normal neurocognitive experience that is associated with the brief intrusion of the right hemispheric homologue of the left hemispheric (and strongly linguistic) sense of self into awareness. Within an optimal experimental setting, women reported more frequent experiences of a sensed presence than did men, and men were more likely than women to consider these experiences as "intrusions" from extrapersonal or ego-alien sources. Both effects were predicted by the vectorial hemisphericity hypothesis and the known neurocognitive differences between right-handed men and right-handed women. Sociobiological implications for gender differences in the probability of intercalation between distinctive processes within the left and right temporoparietal lobes are discussed.

Key words: brain, ego-alien intrusions, magnetic field stimulation, male versus female, partial sensory deprivation, self, sense of presence, subjective experience

IF ALL HUMAN EXPERIENCE is produced by the complexities of the structure and dynamics of the brain, then subtle differences in structure between groups of people might be associated with different patterns of experiences. Sexual dimorphism within the human brain has been reported for the preoptic hypothalamic nuclei and the amygdala. Commensurate with the principle relating structure and function, gender differences for both mating preference (LeVay, 1993) and the phenomenology of sexual experience (Reimillard et al., 1983) have been associated with or attributed to these subcortical structures.

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Converging evidence has suggested that the caudal portion of the corpus callosum in normal right-handed women is discernably larger than for normal right-handed men (de Lacoste-Utamsing & Holloway, 1982). Sexual dimorphism within the component of the corpus callosum (de Lacoste-Utamsing & Holloway) that interconnects portions of the occipito-parietotemporal lobes of the cerebral hemispheres should also be reflected by gender differences within domains of behavior and themes of subjective experiences that are most strongly correlated with these regions. That this sexual dimorphism is not an artifact of cultural factors has been indicated by comparable enlargements within analogous sections of the female rat brain compared with the male rat brain (Kopcik, Seymoure, Schneider, Kim-Hong, & Juraska, 1992).

Gender differences in electrical correlates complement the structural observations. Normal women exhibited greater interhemispheric electroencephalographic coherence (less lateralization) within the alpha band (8–13 Hz) over the parietal and occipital lobes compared with normal men (Corsi-Cabrera, Herrera, & Malvido, 1989). Recent magnetoencephalographic (MEG) results have shown comparable and stronger sex differences in brain lateralization for the temporal lobes (Reite, Cullum, Stocker, Teale, & Kozora, 1993).

Both theoretical arguments and empirical evidence suggest that the left hemisphere of the human brain contains unique features that enable human beings to understand language (Corina, Vaid, & Bellugi, 1992), whereas the right hemisphere is statistically more specialized for affective processing (Goldberg & Costa, 1981). The sense of self and conscious awareness have been considered emergent properties of these primarily left hemispheric and linguistic processes (Edelman, 1989; MacLean, 1990). This general localization of linguistic function may also exhibit significant gender differences (Kimura, 1987).

The enhanced egocentricity of normal right-handed men compared with right-handed women (Persinger & Makarec, 1991a) would be compatible with the greater (left hemispheric) lateralization for these men. "Egocentricity" is defined as an enhanced feeling of "specialness" (e.g., answering yes to an item such as "If there was a car accident, I believe I would have a better chance than most people to survive") or the inflated belief in the validity of one's personal experiences compared with those of others. On the other hand, the higher frequency of endorsed anxieties (fears) and the lower self-esteem (the affective component of the self-concept) would be an expected consequence of more frequent emotional intrusions from the right hemisphere due to the enhanced electrical coherence.

Persinger and Makarec (1992a, 1992b) hypothesized that there should exist a right hemispheric equivalent to the left hemispheric sense of self. Intermittent and phasic intrusions of this right hemispheric process (a pattern of neuroelectrical activity) into ongoing left hemispheric awareness would be associated with the "sense of a presence" whose characteristics should be dominated by the

properties of its origin, that is, the right hemisphere. The person should feel or sense the spatial (primarily left side) location of an entity, a sentient being, or "other self," and the experience should be more affective than linguistic. This normal neurocognitive process may have been the source of the mythology of the Muses (entities that presumably inspired artists, writers, and musicians) as well as the experience of spiritual or mystical entities (Jaynes, 1976; Persinger & Makarec, 1992b).

According to the hypothesis of vectorial hemisphericity (Persinger, 1993b), any permanent or transient microstructural arrangement that encourages intercalation of normally mutually excluded processes between the two homologous regions of the temporoparietal lobes would facilitate the experience of the sense of a presence, particularly if they are activated by mesiobasal (amygdala-hippocampal) inputs. If the normal right-handed woman exhibits more electrocortical coherence (less lateralization) between the temporoparietal region and more linguistic representation with the right hemisphere (Kimura, 1987; Kolb & Whishaw, 1990) than the normal man, then these women should display a lower threshold (greater incidence) of these experiences within an experimental setting that would encourage interhemispheric coherence.

Similarly, if men are more lateralized functionally within these regions, a more intense right hemispheric "signal" should be required before intercalation occurs. This sudden and intense intrusion would be sufficient to encourage attribution of the experience to ego-alien or extrapersonal sources. The following experiment was designed to test these hypotheses. Considering the estimated effect sizes (equivalent to correlation coefficients of between .25 and .33) for the gender differences in splenial area of the corpus callosum, calculations indicated that at least 50 men and 50 women would be required for any effect to be discernable according to traditional statistical criteria ($p < .05$).

Because the sense of a presence is associated with complex and subtle neurocognitive processes, these processes could be masked within conventional experimental settings in which exogenous stimuli (vision and sounds) dominate ongoing cognition. Richards, Persinger, and Koren (1993) found that partial visual–auditory deprivation was necessary to free a significant population of neuronal activity that is normally committed to registering the continuous input of background sights and sounds. Richards et al. (1993) suggested that these cells can then be recruited into ongoing neuronal ensembles and hence amplify the intensity of the subjective experiences.

Metaphorically, this technique allows the researcher to amplify the electronic noise within the system; in this instance, the signals would be endogenous or spontaneous neurocognitive patterns. We also found that the application of complex-shaped, weak (1 to 2 microTesla) magnetic fields, pulsed across the volume of space occupied by the person's temporal lobes, may facilitate hemispheric intercalations and augment the emotional dimensions of the experience (Richards et al., 1993). Specific stimulation by these fields over the right but not over the left tem-

poral lobes of normal women induced significantly more apprehensive experiences that were not reported by normal men (Richards, Koren, & Persinger, 1992).

Method

Participants

The participants were 50 male and 50 female volunteers between the ages of 18 and 25 years who were enrolled in 1st-year undergraduate psychology courses and who received 2% bonus points for participation. All were right handed, as defined by their hand preference for writing.

Procedure

The students completed the Personal Philosophy Inventory (PPI; Persinger & Makarec, 1987, 1993) and Vingiano's (1989) Hemisphericity Questionnaire (HQ) during class periods. The PPI contains clusters of (yes–no) items whose total scores have been positively associated with electrical activity within the temporal lobes (Makarec & Persinger, 1990) and reflect a continuum of experiences typically reported by epileptic patients with electrical foci within the hippocampal-amygdaloid regions of the temporal lobes or by very creative individuals (e.g., musicians, poets, artists). This inventory also contains items that are associated with traditional and exotic religious beliefs. The HQ assigns a score for a person along a continuum that has been inferred to reflect dominant left hemispheric cognitive styles (logical) to dominant right hemispheric (intuitive) cognitive styles.

Within approximately 2 to 6 weeks after the completion of the questionnaire, each student was tested singly, but not more than three were tested per day. After a brief period of rapport, the participating student was asked to sit in a comfortable armchair that was housed in a standard acoustic chamber. The participant was then told that the experiment was concerned with relaxation and that he or she could leave the room at any time (none of the participants used this option).

When the participant was comfortable, and after answering technical questions, one half of a ping pong ball containing cotton was placed over each eye, and a modified motorcycle helmet (embedded with four sets of solenoids, arranged in an ellipsoid pattern, along the temporal plane) was placed around the head. The participant sat quietly for 35 min; the only light emerged from a dull (photographic development) red light that was 1 m in front of the participant. At the end of the session, the chamber lights were dimly lit, and the experimenter entered the chamber and removed the eye coverings. The participants then completed an exit questionnaire. All participants were tested by experimenters who were not familiar with the hypothesis or the purpose of the experiment.

Exit questionnaire. The questionnaire (see the Appendix) contained 10 items that began with the following instructions:

> While you were sitting and were wearing goggles, some stimuli were presented. To determine whether you detected them, please indicate the incidence (frequency) of the experiences that occurred from the beginning of this experiment by circling the appropriate numbers: 0 indicates *never*, 1 indicates *occasionally* (or at least once), and 2 indicates *frequently*.

Specific procedures. I had each participant tested only once within the general procedure. The apparatus and field characteristics have been published in detail elsewhere (Richards et al., 1993). Essentially, a specific amygdaloid burst-firing-like pattern was generated by a computer. The signal was presented for 250 to 300 msec once every 4 s. This temporal structure of magnetic field presentation was selected because it has been associated with elevations along the hedonic dimensions of subjective narratives (Richards et al., 1993). Because any pair of solenoids was activated out of phase (i.e., a north pole for one of the pairs was programmed to be associated with a south pole of the other), the field was propagated through the brain. The shift from one pair of solenoids to the next was 0.5 s resulting in one complete spatial cycle every 2 s.

This magnetic pattern was presented as 5 min off–10 min on intervals during the 35 min. This longer periodicity was selected because cells often habituate to continuous magnetic field presentation within about 15 min and because I considered repeated on–off episodes more optimal to encourage the types of transients that are associated with interhemispheric intercalation and consequently the experience of a sensed presence. A Metex N3800 meter coupled to a magnetic sensor (Electric Field Measurements; Rt 183, W. Stockbridge, MA 01266) indicated that field strength ranged between 10 and 20 mG (1 to 2 microT) within the region of the temporoparietal cortices.

Statistical analyses. I completed one-way analyses of variance (ANOVAS) between each of the 10 items from the exit questionnaire as a function of gender. To control for a potential response artifact of general endorsement of any subjective experience, I calculated three additional relative measures. They were relative sensed presence, relative out-of-body experiences, and relative ego-intrusion experiences. Each was calculated by dividing the score for the item by the mean score for all 10 items.

I used the following clusters of items as covariates from the PPI: the complex partial epileptic-like signs (CPELS), the left hemispheric cluster, the right hemispheric cluster, conservative religious (New Testament) beliefs and exotic or New Age beliefs (e.g., alien intelligence is responsible for UFOs, reincarnation); I also used Vingiano's HQ as a covariate. I included analyses of covariance (ANCOVAs) to remove the potential contribution of a priori beliefs and complex partial epileptic-like signs, as inferred by psychometric measures, to the participants' responses within the experimental setting.

I completed factor analyses (principal component: PA1) and varimax rotation for the 10 items for men and women separately (SPSS). Because of both the sample size and dispersion characteristics of the scores, only factor loadings with $r > .49$ were accepted a priori as statistically significant. For all ancillary statistical procedures, I also used SPSS software on a Vax 4000 computer.

Results

The means and standard deviations for the absolute incidence of different subjective experiences for the 50 men and 50 women are shown in Table 1. ANOVAs indicated that only the gender differences between the magnitude of the absolute and relative incidence of sensed presences were statistically significant, $F(1, 98) = 4.27, 4.21$, $p < .05$, respectively; $\eta = .21$. The results of the ANCOVAs for the incidence of a sensed presence between men and women within the experimental setting, after the shared variance with various indicators of beliefs, hemisphericity, or temporal lobe lability had been controlled, are shown in Table 2. Even after the shared variance between these variables and the score for a sense of presence within the chamber had been removed, the statistically significant gender difference remained and was equivalent to a correlation coefficient of between .24 and .34.

TABLE 1. Means and Standard Deviations for Men ($n = 50$) and Women ($n = 50$) for the Incidence of Various Subjective Experiences Within the Experimental Setting

	Men		Women	
Variable	*M*	*SD*	*M*	*SD*
Dizzy	1.04	0.77	1.12	0.71
Presence	0.24	0.53	0.51*	0.70
Tingling	0.97	0.82	1.13	0.75
Vibrations	0.78	0.81	0.67	0.71
Out-of-body-experience	0.53	0.76	0.65	0.80
Ego-alien intrusion	0.11	0.38	0.18	0.48
Fear	0.42	0.62	0.56	0.67
Somewhere else	0.89	0.88	1.00	0.87
Spinning around	0.44	0.76	0.51	0.78
Dream images	0.42	0.58	0.35	0.68
Relative presence	0.25	0.58	0.54*	0.76
Relative out-of-body-experience	0.02	0.03	0.02	0.03
Relative intrusion	0.16	0.38	0.21	0.66

*$p < .05$.

TABLE 2. Results of Analysis of Covariance for the Gender Difference in the Incidence of Sensed Presence

Covariate	Coefficient	Fc	*F*	η
—	—	—	4.27*	.21
HQ	.38	1.00	4.79*	.24
Muse	–.008	< 1.00	4.77*	.22
CPELS	.80	4.14*	4.50*	.29
LH/RH	–.63/.68	3.10/2.03	7.71*	.34
RB/EB	–.51/.09	4.92*/< 1	5.47*	.32

Note. Values for the raw regression coefficients, the *F* ratio for covariate (Fc), the *F* values after the shared variance was removed (*F*), and the strength of the association (η) are shown. The covariates were Vingiano's (1989) hemispheric quotient (HQ), the Muse factor, and complex partial epileptic-like signs (CPELS). The contribution of two sequential covariates, left hemispheric (LH) and right hemispheric (RH) indicators and religious beliefs (RB) and exotic beliefs (EB), are also shown.
*$p < .05$.

TABLE 3. Factor Loadings (After Varimax Rotation) for Each of the 10 Types of Experiences Reported for Men ($n = 50$) and Women ($n = 50$), for the Factor That Was Primarily Loaded by "The Sensed Presence"

Variable	Men	Women
Dizzy or odd	.10	.62[a]
Presence	.94[a]	.65[a]
Tingling	.18	.15
Vibrations	–.02	.22
Out-of-body-like-experience	.08	.68[a]
Ego-alien intrusion	.83[a]	.06
Fear or terror	.07	.53[a]
Somewhere else	.45	.74[a]
Spinning around	–.01	.68[a]
Dream images	–.10	.31
Eigenvalue	1.15	2.93
% of variance	12	29
Total factors	4	3
Total % of variance	68	56

[a]Significantly associated with factor, i.e., $r > .49$.

The second hypothesis that men would more likely attribute the sense of a presence to "another mind," an ego-alien source, was also supported. Table 3 shows the factor loadings of the 10 items for the factor that was exclusively and primarily loaded by the sensed presence item. Men and women were analyzed separately. Women who experienced a sensed presence also reported more dizziness, out-of-body-like experiences, fear or terror, spatial detachment ("feeling as if they were somewhere else"), and vestibular (spinning) sensations. On the other hand, only the ego-alien intrusion experiences loaded on the same factor as the sensed presence for the men.

Discussion

The fundamental principle of neurophenomenology is that themes (and content) of subjective experiences at any given time are a function of those portions of the brain that are most metabolically active (Pawlik & Heiss, 1989; Persinger, 1993a, 1993b). The sensed presence has been hypothesized as the awareness of the right hemispheric homologue of the person's own sense of self (Persinger & Makarec, 1992a). Gender differences in the microstructural factors (de Lacoste-Utamsing & Hollway, 1982; LeVay, 1993; Reite et al., 1993; Witelson, 1991) that determine which cortical regions and synaptic aggregates within these regions are activated should also affect both the occurrence and the types of experiences that originate from these shared sources of psychometric variance.

Normal right-handed women exhibit less lateralization than do normal right-handed men within the temporoparietal region (Gordon, 1991). An enhanced interhemispheric coherence for these women would be expected to increase the probability, under optimal conditions, of the intrusion of the right hemispheric homologue of the sense of self into awareness. The results of the present study supported this hypothesis and indicated that the incidence rate of a sensed presence is about twice as frequent among normal women relative to normal men. The effect size was small (ηs between .21 and .34, i.e., explaining between 4% and 10% of the variance) but comparable to the reported magnitude of the sexual dimorphism of the (cross-sectional area) splenium of the corpus callosum (de Lacoste-Utamsing & Holloway, 1982). That the enhanced incidence of a sensed presence for women, compared with men, was not an artifact of a propensity to report more subjective experiences within this experimental context was indicated by the persistence of this effect even when the proportional scores (sensed presence divided by the mean of all experiences) was considered.

Greater quantification of the microstructural differences within the left and right parietotemporal lobes of normal men and women could help explain the subtle complexities of the male and female self-concept. If the human sense of self is strongly correlated with, or even a consequence of, linguistic processes (Edelman, 1989; Persinger & Makarec, 1992b), then enhanced lateralization of linguistic processes within normal right-handed men might explain their

enhanced egocentricity and elevated self-esteem relative to normal right-handed women. Relatively fewer apprehensive intrusions would foster the perception of a special and unique phenomenological state. When right hemispheric intrusions did occur, they would be experienced as, or attributed to, nonself (ego-alien) sources.

However, the more electrocortical homogeneous (Corsi-Cabrera, Herrera, & Malvido, 1989) female brain would invite more frequent hemispheric intercalations. These intrusions into left hemispheric processes from the right hemispheric homologue of the sense of self would encourage greater self-awareness, less egocentricity, more subtle discrimination (innuendos) of the affective components of language, and more dependence on intuition. These women should report experiences that are associated with "right hemispheric" functions and phenomenology (Persinger & Makarec, 1991a).

The results of the factor analyses in this study are commensurate with this explanation. Whereas only the report of an ego-alien sensation (i.e., the "experiences did not come from my own mind") was significantly associated with the same factor that was loaded by the sensed presence for men, the factor that contained the sensed presence for women was also loaded by items that inferred experiences of vestibular (spinning) movements, fear or terror, out-of-body-like experiences, and spatial displacement (feeling as if the person is somewhere else). These sensations are evoked by right temporoparietal lobe stimulation by magnetic fields in women but not in men (Richards, Koren, & Persinger, 1992) and are associated with the duration of alpha rhythm activity over the right but not over the left temporal lobe (Persinger & Richards, 1994).

Because one of the major properties of right hemispheric function involves vigilance and anxiety, the net consequence for these frequent intercalations could be elevated generalized apprehension. The more frequent intrusions of strong and unpleasant affect into left hemispheric processes that generate self-concept would be expected to influence the affective (self-esteem) but not the cognitive component of this construct. Although learning history, verbal labeling, and cultural roles would no doubt contribute to lower self-esteem in women, compared with men, sexual dimorphic factors may be equally potent determinants. Clearly, the effect size of the sexual dimorphism or the phenomenology is not sufficient to discriminate individuals or to predict exclusive characteristics of a particular man or woman. These features would primarily emerge within very large aggregates of men and women.

The results of the present study may be generalizable only for right-handed men and right-handed women. Gordon (1991) has suggested that left-handed men share greater commonality with normal right-handed women, whereas left-handed women are more similar to higher functioning right-handed men. If this pattern and the vectorial hemisphericity hypotheses are correct, then left-handed men should experience more frequent sensed presences and lower self-esteem than their right hemispheric counterparts. A recent epidemiological analysis of

over 1,000 questionnaires (Persinger, 1992) indicated that the incidence of "a sensed presence" among left-handed male meditators was significantly greater than for right-handed men and was more similar to the incidence of "a sensed presence" in right-handed women.

Within the tradition of Annett's (1991) human balanced polymorphism and Witelson's (1991) sexual mosaicism, the subtle differences in the neurocognitive patterns of the sense of self for normal right-handed men and women would be complementary and not an index of "better or worse." From the much larger perspective of species-survival (Wickler, 1973), egocentric men who experience less self-anxiety, fewer fears or phobias, and marked elevations in a belief in the survival of the self might facilitate the survival of the group during warfare, exploration, and acquisition of basic reinforcements. On the other hand, the enhanced vigilance of normal women as a result of more frequent right hemispheric intrusions and intuitive cognitive styles would facilitate protection and preservation of offspring.

However, there is a potentially negative consequence of these small neurocognitive differences in the sense of self. When right hemispheric intrusions occur in the male brain, they could be attributed more frequently to ego-alien or external influences such as gods or (the more recent god surrogate) extraterrestrial alien intelligence. The importance of this process is suggested by the historical proclivity for normal men to use these ego-alien intrusions as justifications for aggression and for the mass slaughter of other human beings because of "divine consent." The experience of "divine consent" is often described as an overpowering conviction that an idea has been condoned by a sensed presence. It is attributed by the experiencer to an omnipotent extracorporeal being that is perceived as boundless in time (eternal) and space (omnipresent).

The potential for the experiences during a sensed presence to be interpreted as a consent or a justification for homicide may be more prevalent than is assumed. About 7% to 8% of normal and relatively educated men admit they would kill other people if God told them to kill or they would eliminate others in Allah or Jehovah's name. The enhanced incidence of this thinking was more typical of men (but not of women) who attend church frequently (Persinger, 1993a). The proportion of respondents who would kill in a deity's name increased to 44% if the respondents were men, attended church regularly, reported a religious experience, *and* exhibited symptoms associated with lability of the limbic system (Persinger, 1997).

The results of this study suggest that the sense of a presence, an experience that may be the prototype to perceived sentient beings often attributed to gods or aliens, can be evoked by experimental conditions that enhance intercalation between the two hemispheres. The cluster of experiences associated with the presence differed for men and women and may help explain historical and contemporary differences in the male and female sense of self and their interpretations of the sensed presence.

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APPENDIX
The 10 Items of the Exit Questionnaire

1. I felt dizzy or odd.
2. I felt the presence of someone or something.
3. There were tingling sensations.
4. There were pleasant vibrations moving through my body.
5. I felt as if I had left my body or was detached from my body.
6. The experiences did not come from my own mind.
7. I experienced terror or fear.
8. I felt as if I was somewhere else.
9. I felt as if I was spinning around.
10. There were images from a dream I've had.

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